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ABSTRACT

This introductory chapter addresses the question of whether the field of instructional development is a science, an art, or some combination of the two. It is suggested that the field is not merely a collection of flow charts, diagrams, and techniques, but a unified whole, to be understood first in terms of its underlying research foundation, conceptual structure, and fundamental tools and models. The implicit existence of a paradigm for the field is suggested, although it is noted that many in the field do not believe that such a paradigm exists. Finally, the current state and future of the field, both as a profession and as a business, are considered. (5 references) (Author/EW)

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I. INTRODUCTION

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Chapter 1

Instructional Development: Art? Science? or Both?

Charles R. Dills
Ronald K. Bass

Once upon a time, in a land far, far away, some people involved with education, innovation, training and such things got together and invented the science of instructional development. Then they formed a profession whose members practiced that science. The science developed, revealing many new truths concerning the development and implementation of instruction. The members of that profession then lived happily ever after, having killed the mean ol' dragons of tradition, confusion, non-behavioral objectives and inadequate media selection models.

A fairy tale, or history? The present book was conceived with the thought in mind that the above paragraph represents actual history, or if not altogether history, represents history as projected into the near future. The purpose of the editors was to tell the members of the profession what the latest revelations of instructional development science are, and to describe the battles the professionals had recently fought, giving the list of newly-dead dragons.

Whether or not such a science exists, whether or not it has anything to reveal if it does exist, and whether or not there is a profession to receive these revelations are questions which each person must answer for her/himself after having read the rest of the book. The authors, through soliciting and editing chapters, have formed opinions concerning these matters, however, and these will now be presented. This is done in part so as to expose the biases of the book, and in part to serve as an advance organizer for the chapters which follow.

As for the first question, is there a science of instructional development? Or, is instructional development dependent upon some underlying science of human behavior or of learning? The authors began work upon this book believing there to be such a science, either a science of instructional development or an underlying science upon which instructional development draws for its effectiveness.*

As we neared the completion of the work, however, we had changed our views on both of these matters. First, we no longer believe there is a science of instructional development being practiced. Second, we no longer believe there to be an underlying science upon which instructional development draws for its effectiveness. We do, however, believe there to be a profession of instructional development which is being practiced by many people; this profession has a great many problems however, and if some of these problems are not resolved, that profession may not exist for long.

The reasons behind these three beliefs will now be examined in greater detail.

These reasons will be stated in terms of the concept of a paradigm. Lachman, Lachman and Butterfield (1979) explain this term as a "...common set of ideas a subgroup of scientists bring to their subject matter." More fully, they explain that

*The term "science" has been given many meanings. Here it is to be given a meaning consistent with its use by Kuhn (1970) and by Lachman, Lachman and Butterfield (1979). Specifically, for our purposes, a science is that set of processes and products which is the intellectual propety of a community of professionals practicing research within a shared paradigm and within a shared disciplinary matrix, as these terms are used by Kuhn (1970).

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> The commitment to use the scientific method in studying the higher mental processes obviously sets limits on one's scholarly investigations. However, a multitude of further decisions must be made, implicitly or explicitly, before the decision can be made as to what ideas are relevant in creating hypotheses about the nature of mental processes; what hypotheses are plausible and worthy of study; what should be studied first and what should be deferred until later. Scientific psychologists can legitimately differ in the ways they resolve these questions. However, within scientific disciplines, there is a tendency to form subgroups whose members adopt very similar resolutions. When a sufficiently large number of scientists in a field agree to a considerable extent on how such questions are to be resolved, they are said to share a paradigm.

First, it is reasonable to assume that if a science of instructional development existed, all major writers on instructional development would be working within a single paradigm. "A paradigm is what the members of a scientific community share, and conversely, a scientific community consists of men who share a paradigm." (Kuhn, 1970, p. 76)

Second, such a paradigm would spawn research designed to explore that paradigm. "We must recognize how very limited in both scope and precision a paradigm can be at the time of its first appearance...the success of a paradigm...is at the start largely a promise of success discoverable in selected and still incomplete examples. Normal science consists in the actualization of that promise, an actualization achieved by extending the knowledge of those facts that the paradigm displays as particularly revealing, by increasing the extent of the match between those facts and the paradigm's predictions, and by further articulation of the paradigm itself." (Kuhn, 1970, p. 23-24).

Third, graduate instruction would be designed to induct graduate students into the maintstream of activity and conceptual structure associated with the paradigm. "Scientists, it should already be clear, never learn concepts, laws, and theories in the abstract and by themselves. Instead, these intellectual tools are from the start encountered in a historically and pedagogically prior unit that displays them with and through their applications to some concrete range of natural phenomena; without them it would not be even a candidate for acceptance. After it has been accepted, those same applications or others accompany the theory into the textbooks from which the future practitioner will learn his trade. They are not there merely to embroidery or even as documentation. On the contrary, the process of learning a theory depends upon the study of applications...that process of learning...by doing continues throughout the process of professional initiation. As the student proceeds from his freshman course to and through his doctoral dissertation, the problems assigned to him become more complex and less completely precedented. But they continue to be closely modeled..." (Kuhn, 1970) on the paradigm governing his field.

But clearly, there is no such paradigm. Evidence for this comes from three sources, the three sources mentioned in the above asumptions. First, the leaders in the technical development of the field are clearly operating within conceptual frameworks which will not fit within a single paradigm. One merely has to read the chapters of this book on student selection, by Merrill, and those on military ISD models, by Platt, Andrews and Goldman, to realize that they are operating within different paradigms. Other examples would be provided by comparing the work on cognitive style mapping, by Bass and Hand (1978), the work of Holland (1976) in applying the experimental analysis of behavior to instructional development, the writings of Gilbert, such as Human Competence (1978), and the chapter in this book by Stahl, to see that no two of these writers are operating within the same paradigm.

Second, research models presented implicitly both within the present volume and elsewhere show that a great deal of eclecticism is practiced. When considering method, for example, we find not the single generic method of research commonly found in a single paradigm, but a whole range of methods. Naturalistic inquiry, classical research design, experimental analysis of behavior, multiple regression, factor analysis, single-case methods, formative evaluation, summative evaluation, and economic analysis are all research methods practiced and advocated by large numbers of writers in instructional development. But a paradigm is characterized by a single method or by a small set of methods all built around a common concept. Thus, again, no single paradigm can be found, and so no science exists.

Third, graduate students are trained to follow the methods and to accept the concepts taught by their professors. As can be seen from the above, the professors differ. Therefore one would expect their graduate students to differ. This is in fact what one finds. Clearly there are differences in course structure and program emphases among graduate programs in any field, but there are also major differences among instructional development programs in terms of what the core subject is taken to be; this situation is found only in fields without a single paradigm. We have all heard many times how, when a graduate of one program hires a graduate of another program, she/he feels the necessity to re-train the new employee before she/he is of any use. This seems to be true whether a graduate of Michigan State hires a graduate of Florida State, for example, or whether a graduate of Florida State hires a graduate of

Michigan State. And both would find it difficult to work with a graduate of a Mager course having twenty or so years of practical experience in the military. This is a prime sympton of the use of different paradigms in the different schools.

But if the paradigms used in training graduate students differ from institution to institution; if the leaders of the field differ according to what research methodologies they use; and if the basic literature of the field cannot be subsumed under a single conceptual set; if these conditions for the existence of a science cannot be met, then we must conclude that there exists no such science. There is, in short, no single science of instructional development.

"Men whose research is based on shared paradigms are committed to the same rules and standards for scientific practice. That commitment and the apparent consensus it produces are prerequisites for normal science... except with the advantage of hindsight, it is hard to find another criterion that so clearly proclaims a field a science." (Kuhn, 1970)

Could it be that all of these various conceptual approaches draw upon a single underlying science for their basic structures and their vitality? Such a situation is theoretically possible. It would require that each of the major threads of development above draw upon and elaborate distinct segments of that underlying science, they would have to qualify and delimit each other in such a way as to allow them to function consistently with each other, forming a single structural whole. Second, when considered alone, they each would have to be capable of developing consistently along lines which are inconsistent with each other. While not impossible, such a structure is highly unlikely to exist.

On a less theoretical level, some of the approaches mentioned earlier draw upon psychology, some upon systems theory, some upon the hueristics of development, some upon statistical theory and some upon anthropology, while others are non-statistical in nature. Experimental behavior analysts, cognitive processing psychologists and anthropologists usually consider that they are practicing different sciences. These different approaches certainly appear to be different paradigms competing with each other for followers and for application to the same problems. They do not seem to be different aspects of the same paradigm. Thus it seems clear to the authors that no single science underlies all of the work in instructional development, either when considered as a research area or as an area of professional practice. There may be a sense, however, in which it can be said that there are **sciences** underlying instructional development. For clearly there are sciences upon which we draw for factual information concerning human behavior, message design and other sets of facts with which we work. We also draw upon these sciences for methods of research and of design. But except in the sense that we borrow from them, these sciences are in no way the source of the vitality of instructional development. There is no science in existence which functions as a single, unitary foundation for instructional development, upon which instructional development has depended for its vitality in the past and upon which it can expand in the future.

Nevertheless, instructional development clearly exists, in the sense that people who call themselves instructional developers practive a set of behaviors collectively called instructional development. What, if not a science, are these people practicing? The editors are not certain. The situation is confusing. Instructional development, as practiced, appears to be different things when viewed within different environments. Sometimes it appears to be an art form. Other times it appears to be a technology, completely devoid of creativity and relatively sterile, but yet successful at producing what it was designed to produce (whether or not that is what is needed). Occasionally it appears to be what we all claim it to be--a true profession. Seldom does instructional development appear to have all of the characteristics required by an occupation to be considered to a true profession, as the sociologists define this term. However, it often appears to have some subset (often a small subset) of these. Is this adequate to permit instructional development to qualify as a true profession? Probably not.

Most of the time, when viewed in practice, instructional development appears to simply be a business, no more and no less. As such, it occupies an important but fairly limited niche in the training and education industry, and given favorable conditions, it will maintain that position for some time to come.

Many will see the above statement as negative, as attacks upon and criticisms of, instructional development and instructional developers, but they are not intended to be. It is not a criticism of a Robin to recognize that he is not an Eagle, even though it may seem so to those who previously believed and desired him to be an Eagle. But these conclusions do leave us with a question--what sort of a business is instructional development?

Again judging only through our own perspectives, the editors see instructional development as a part of the training-and-employee development industry, and also as a small part of the higher education industry. It is not the most-commonly practiced segment of that industry; stand-up lecture and multi-image media production (film, television and sound-slides, for example) and those following the humanistic tradition in training seems to comprise a larger segment of that business than do instructional developers.

Is the profession/business a healthy one? That is, is it expanding in terms of its influence over the conduct of training? Is it becoming recognized by management as indispensable to the conduct of commerce and industry? of military affairs? of government? of education? The answers appears to be yes and no, but largely no.

Several reasons exist which can be used to explain why instructional development has not yet become all that we might wish it would (and that we might wishfully believe it already has or inevitably will). First, we have yet to produce and widely distribute to the public conclusive evidence that instructional development produces significant improvements over whatever else is available. And significance has to be expressed in terms meaningful to the audience, not just to ourselves. Second, the distinction between instructional developers and other trainers is blurred in the minds of most people in management positions, whether in industry or universities. This is basically because the distinction is often blurred within our own organizations. Third, we are not yet a profession, in terms commonly used to distinguish professions from non-professions. We do not yet have certification, we are even further from professional licensing. And until we show that certified developers are superior to uncertified developers (as a minimum) we won't have licensing.

We are, in short, a business involved with behavioral change, we take an approach somewhat akin both to engineering and to advertising, we are in competition with other types of behavioral change approaches, and we have not managed to appear to many of our potential customers as better than, or even significantly different from our competitors.

We are not, in fact, always different from our competitors in terms of the improvement in training we produce. We are capable, theoretically, of producing great improvement over traditional methods. But for many reasons this improvement is often not realized in practice. For one thing, much of the knowledge which has accumulated concerning human behavior is often ignored. Second, many practicing instructional developers do not really believe in instructional development, and so do not use it. What they use instead is traditional design methods camoflauged to look on the surface like instructional development. Third, since one of the factors to consider in instructional development is customer acceptance and cost, and since a fixed budget is often fixed by a management unaware of or unable to take advantage of the potential of the complete instructional development process, the total process is often shortcutted and the full range of alternatives at each decision-point are not considered. Thus, while the product may be produced within the time, budget and political constraints prevailing, the product is little better than that which traditional training methods would have produced. In fact, it is often very little different from those traditionally used, but cost more to produce. Management will not fail to notice this, but will very likely fail to notice that this was the result, not of instructional development, but of management own limiting decisions.

The future of instructional development as a profession and as a successful business depends to a large measure upon changing the above situation. Whether or not it will change we leave to you to decide for yourself, but it is a fact that many people connected with the field hold bleak hopes for such change. We have been told by practitioners that instructional development is here to stay. But we have also been told by publishers that instructional development has died and merely awaits burial. There is another, and equally valid, view of current practices in instructional development. Many instructional development shops could be identified which produce excellently developed products. These shops exist within each of the sectors identified above. These shops produce, consistently, products which are much better than traditional practice would have produced. Thus there are, in effect, two separate states-of-the-art of those who have adopted instructional development terminology and surface features, but who do not in fact produce instructional well-developed products. These shops constitute a majority of the profession, it appears to the authors. A large minority, however, have adopted instructional development as a process and have incorporated it into their Deep-Structure. These shops do produce well-developed instruction. An analogy distinguishing and describing these two groups might be made by considering language learning. Someone who has only learned the surface features of a language cannot communicate well in that language, while someone who has learned the Deep-Structure of the language can. The problem with the profession, within this analogy, could be described by considering the problem of a non-speaker of that language (the customer) would have in distinguishing between the two. He may not be able to do so. If they both wrote letters in this language for the customer, one's letter might read well, and the other's might not, but the customer might not be able to tell the difference. If he somehow found that one such letter was bad, he might fire both people for incompetence and instructional development may not ever become a full profession, because too many poorly-developed products are being sold as instructionally developed.

These are the authors' views of the current state-of-the-art of instructional development on two levels of competence. Many readers may disagree with our conclusion, and argue that the present condition of instructional development is healthy and that instructional development is well-accepted and usually produces good products.

Which is right? Probably both, depending upon where you are looking and where you are looking from. We leave it to the readers to gather and analyze more extensive data to either support or refute these views. But a third level of competence exists within the field, and the following chapters were selected to demonstrate the state-of-the-art on this level of competence at various points throughout the field.

The chapters which follow are an attempt to explore the frontiers of instructional development, by examining selected topics in depth. These

chapters do not, when taken in total, cover the entire field of instructional development. Each of the existing and projected volumes of the series, when taken together, it is hoped it will provide such coverage.** But no single volume can do so.

The authors for the various chapters were selected by polling a sample of the field to determine who were viewed as leaders in the development of instructional development. The literature was also searched to supplement the results of this pole. These authors were then contacted and asked to prepare chapters upon the areas of research, development and practice with which they were most familiar or considered most important.

The editors then confined themselves to matters of editorial support--grammar, English usage, standardizing references and other formatting features, etc. Contents were entirely the responsibility of the chapter authors. Thus, again, the editors have left it to the reader to assess the validity of the picture presented herein of the state-of-the-art of this third level of instructional development. The editors' view of this level is presented in the Summary chapter, but it in no way impacted the contents of the rest of the book.

The editors realize that not all aspects of current best thinking and practice have been included. In particular, three kinds of omissions have occurred.

Type I omissions resulted from the ignorance of the editors. There undoubtedly topics which should have been included but which were not, because the editors either were unaware of the topics or didn't know anyone both capable of and willing to prepare chapters outlining the latest development in these topics.

Type II omissions involve those topics for which the authors wanted to include chapters, but in which no new developments have occurred or which have not yet been incorporated into instructional development theory and practice.

Type III omissions include all those topics which, though included in many books on instructional development, the editors do not view as being properly a part of instructional development. Many topics dealing with the uses of computers, satellites, distant education, and the other new technologies, for example, are topics the practicing instructional development person may not need to understand, depending upon what types of systems within which his designs are used. But they are not, according to the editors, a part of instructional development. Just as, for example, word processing and counseling are not a part of instructional development, even though individual instructional development professionals might need to use them, depending upon the work environment within which she/he practices.

It remains only to explain the layout of the book before the reader is turned loose to devour its contents. The chapters are clustered into sections, not to the exact topic of the chapter, but according to the function in the instructional development process that topic concerns. For instance, Section II deals with **Strategy,** subdivided under the headings of **Metatheory** and **Strategies.** These chapters deal with the generalship of instruction development.

Chapters in Section III are grouped under the heading of **Tactics,** and these chapters deal with the methods involved in implementing the grand theories discussed in the previous section.

The fourth section is titled **Logistics.** This section deals with matters such as evaluation, staffing and cost-effectiveness, which are not a part of the grand strategies nor of the tactics which implement them, but which serve in a supportive role and without which the grand strategies probably would fail.

Section V is titled **Diffusion.** This section addresses the question, how do the grand strategies, tactics and their supportive elements interface with the rest of society, and how do we get people to implement these strategies?

Applications of instructional development in various settings, such as the military, the international sector, and industry, are explored in Section VI.

Personnel are dealt with in Section VII. Such areas as the training and certification of instruc tional developers, and the status of women in the profession, are explored here.

Section VIII deals with **Futures** of instructional development, and finally comes Section IX, the **Summary.**

The source of the plan for organizing the chapters of the book is probably obvious by now. It is a plan similar to one which might be found in a textbook on military affairs. Perhaps the similarity in organizational plans can serve as an analogy to show the similarities between the two professions of military science and instructional development. Neither are true sciences. Both have specific areas of human behavior with which they deal. But both obtain most of their content from other sciences. Further, both are aimed at practical achievement, not at the accumulation of knowledge. Knowledge is valued by both professions only to the extent that it proves useful in achieving important goals. Further, the success of the practitioners of both professions derive much more from the plans of attack, the faithfulness of execution of these plans, and the insightfulness and creativeness of the individuals executing them, than from the knowledge of human behavior, elec-

**The present volume is the second volume in a series. The first volume, published in 1978, covered topics not included in the present volume. Both volumes taken together are necessary to obtain maximum coverage of the field; they are complementary volumes. Future volumes in the series will extend this coverage, as well as update topics whose coverage in the present two volumes has become dated.

tronic devices and theoretical superstructures composing the trappings of these sciences.

What follows partakes of the most advanced aspects of these trappings. However, the editors are sure the readers will find much of the above-mentioned insightfulness, creativeness, and faithfulness to well thought-out plans in the chapters which follow.

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